

# THE VASCULAR FLORA OF SAVAGE GULF, TENNESSEE<sup>1</sup>

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Remnants of pristine forests are manifestly important to both present and future generations of mankind. Such areas offer unique aesthetic experiences, demonstrate balanced ecosystems, support a rich fauna and flora, and most importantly, demand the acute awareness of persons interested in their preservation. According to Quartermann, Hemmerly and Turner (1972), a relict stand in Savage Gulf "... appears to be the only virgin tract of typical mixed mesophytic forest remaining in Tennessee. . . ."

Savage Gulf is within the proposed Savage Gulf Natural Area which includes the gorges and adjacent uplands of Savage Creek, upper Collins River, and Big Creek. The Tennessee Department of Conservation now owns a significant portion of this 10,000 acre Preserve and negotiations for additional land acquisitions are underway. Now that a means for protection seems assured, it is anticipated that critical habitats will be properly managed and preserved.

Past studies of the floristics and vegetation of the gorges of the Cumberland Plateau of Tennessee are those of Caplenor (1955, 1965), Clark (1966), Quartermann *et al.* (1972), and Sherman (1958). Except for occasional herbarium vouchers deposited at the University of Tennessee, Knoxville, and Vanderbilt University, no extensive collections of vascular plants had been made from Savage Gulf.

This report on the flora of Savage Gulf represents a concerted effort to obtain detailed floristic information about a remnant virgin forest and its immediate surroundings. Data were obtained on the species of vascular plants present, the occurrence of unusual habitats, and the status of rare plants. Although no vegetative sampling or quantitative analyses of plant communities were undertaken, collections were made throughout Savage Gulf and the adjacent uplands (Figure 1).

## GENERAL PHYSIOGRAPHY

Savage Gulf lies on the Cumberland Plateau in eastern Grundy County

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<sup>1</sup> Contributions from the Botanical Laboratory, The University of Tennessee, Knoxville, N.S. No. 503.

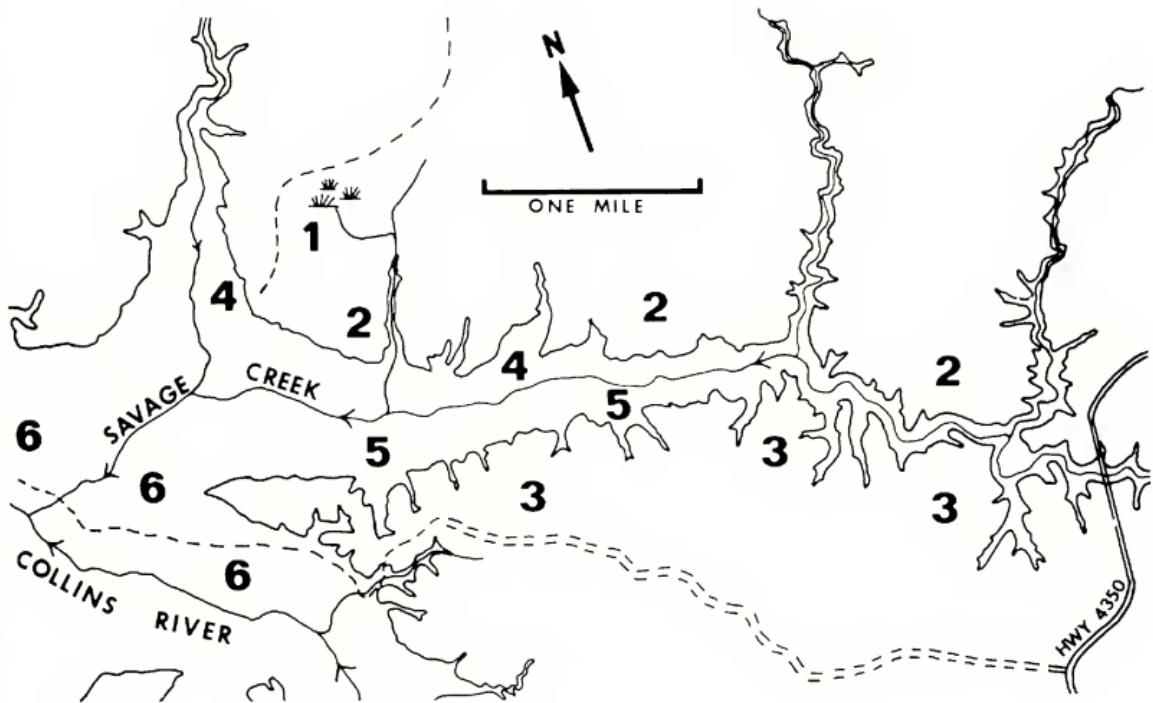


Figure 1. Savage Gulf, Grundy County, Tennessee. The gulf is outlined at the 1800 ft contour which approximates the rim. Numbers 1-6 refer to collection areas (see text for vegetation and topographic descriptions).

approximately 35 miles northwest of Chattanooga, Tennessee. The Cumberland Plateau is the southern extension of the Appalachian Plateau Province (Fenneman, 1938). Since prominent vertical escarpments are characteristics of the region, it is referred to as the "Cliff Section" by Braun (1950).

Savage Creek, the primary stream within the Gulf, flows almost due west and drops from ca. 1740 ft near its headwaters to ca. 970 ft at its confluence with the Collins River for an average gradient of 150 ft per mile. The scenic gorge is extremely steep and hazardous. The rim is roughly 1800 ft in elevation on both the north and south sides. The caprock, composed of a coarse Pennsylvanian conglomerate, is often exposed as vertical cliffs or overhangs ranging from 70 to 140 ft high. From the base of the escarpments the gorge is typically terraced and slope ranges from 45° near the base of the caprock to 15° at Savage Creek. Boulder fields of conglomerate, sandstone, and limestone bedrock fragments are common on both the north and south facing slopes.

#### DESCRIPTION OF THE VEGETATION

Savage Gulf is divided into six areas (Fig. 1) to facilitate annotation of the checklist and to describe the vegetation. For the most part, these areas are natural plant communities that can be defined by their unique indicator species, soils, slopes, and exposures.

Area 1 is an upland swamp that remains relatively wet during the summer and supports a rich flora throughout the growing season. Similar habitats occur infrequently throughout the Cumberland Plateau in Tennessee, but most have a depauperate flora during the drier summer months. Dominant woody species include *Nyssa sylvatica*, *Acer rubrum*, *Liquidambar styraciflua*, *Itea virginica*, and *Viburnum nudum*. The herbaceous layer is characterized by *Osmunda cinnamomea*, *O. regalis*, *Woodwardia areolata*, *W. virginica*, *Carex intumescens*, *C. joorii*, *Lilium michiganense*, *Zigadenus leimanthoides*, *Platanthera ciliaris*, *P. clavellata*, *P. cristata*, *P. integrilabia*, *Isotria verticillata*, *Xyris torta*, *Rhynchospora corniculata*, *Juncus repens*, *Parnassia asarifolia*, *Proserpinaca pectinata*, and *Aster umbellatus*. Taxa from this area that have affinities with the Coastal Plain, although not restricted to it, include *Woodwardia virginica*, *Juncus repens*, *Rhynchospora corniculata*, *Itea virginica*, and *Proserpinaca pectinata*.

Area 2, the north rim, and area 3, the south rim, include the relatively flat to rolling uplands of the surrounding Cumberland Plateau. Both areas are disturbed to varying degrees by logging and support a similar flora. In general, the vegetation of the regenerating forest is dominated by various species of *Quercus* and *Carya*. Other frequent trees and shrubs are *Pinus echinata*, *Oxydendrum arboreum*, *Calycanthus floridus*, *Nyssa sylvatica*, *Viburnum acerifolium*, *Rhododendron nudiflorum*, and *Vaccinium* spp. Occasional small streams that are perpendicular to the rim of the gorge support dense understory vegetation of *Kalmia latifolia*, *Tsuga canadensis*, *Ilex opaca*, and

*Euonymus americanus*. Several noteworthy herbs occur chiefly in the upland woods, namely, *Chamaelirium luteum*, *Cypripedium acaule*, *Malaxis unifolia*, and *Monotropa odorata*. A small swamp on the extreme western end of the south rim is dominated by *Woodwardia virginica*. The distribution of this infrequent fern in Tennessee is discussed by Wofford, Webb, and Dennis (1977).

Area 4 represents the south facing slope of Savage Gulf. Extensive boulder fields with thick entanglements of *Parthenocissus quinquefolia* and *Rhus radicans* characterize much of the upper slope. The herbaceous flora is meager on these drier sites, but is relatively rich on more mesic sites near Savage Creek. A few of the more common spring wild flowers found on the lower slope are *Orchis spectabilis*, *Cypripedium calceolus* var. *pubescens*, *Hexastylis arifolia*, *Geranium maculatum*, *Sedum ternatum*, *Viola conspersa*, and *Phlox divaricata*. Quarterman *et al.* (1972) sampled the overstory on the south facing slope and found high importance values for *Quercus prinus* (85.4), *Carya tomentosa* (56.7), *Quercus rubra* (56.6), *Liriodendron tulipifera* (23.3), *Quercus alba* (23.0), *Carya ovata* (17.6), *Carya ovalis* (12.0), and *Pinus virginiana* (11.0). Furthermore, they consider this forest to be an oak-hickory-tuliptree expression of the mixed mesophytic forest type.

Area 5, the north facing slope of Savage Gulf, is the most floristically diverse area. The spring and early summer flora contain many elements of the hardwood forest of the Appalachian Mountains. Common among these are *Dryopteris intermedia*, *Disporum maculatum*, *Trillium erectum*, *Polygonatum pubescens*, *Aristolochia macrophylla*, *Claytonia caroliniana*, *Mitella diphylla*, *Viola blanda*, and *Chelone lyonii*. *Dryopteris goldiana*, *Athyrium pycnocarpon*, *Phacelia bipinnatifida*, and an occasional element more typical of the Interior Low Plateau and Central Lowland Provinces, such as *Trillium recurvatum* and *Stylophorum diphyllum*, are other features of Area 5. Two particularly northern elements, *Streptopus amplexifolius* and *Maianthemum canadense*, are reported by Quarterman *et al.* (1972), but were not observed in the present study and specimens have not been located.

Many co-dominants occupy the overstory of Area 5. Quarterman *et al.* (1972) report high importance values for *Tilia heterophylla* (61.7), *Tsuga canadensis* (54.4), *Acer saccharum* (40.0), *Liriodendron tulipifera* (37.6), *Aesculus octandra* (23.1), *Carya tomentosa* (20.8), *Fagus grandifolia* (17.1), *Quercus rubra* (12.6), and *Magnolia acuminata* (12.2). *Cladrastis lutea*, an uncommon tree of the eastern U.S., occurs sporadically in the understory. In addition, Quarterman *et al.* (1972) consider the north facing slope to more closely resemble Braun's (1950) typical mixed mesophytic forest of the Cumberland Mountains than adjacent mixed mesophytic stands in Tennessee.

Area 6 is defined as the mouth of Savage Gulf and consists of many habitats from flood plain woods to open, drier limestone outcrops. Savage Creek runs underground in the mouth of the Gulf, except for periods of high

rainfall when torrents may increase the water's height above ground by 10 to 15 ft. The flood plain woods is composed of cutover pines (*Pinus echinata* and *P. virginiana*), several oaks (*Quercus falcata*, *Q. alba*, *Q. rubra*), *Platanus occidentalis*, *Carpinus caroliniana*, *Crataegus* spp., and *Liquidambar styraciflua*. Characteristic shrubs along the bouldery channel are *Xanthorhiza simplicissima*, *Dirca palustris*, *Ilex ambigua* var. *montana*, *Cornus amomum*, *Rhododendron arborescens*, and *Viburnum rufidulum*. Herbaceous taxa that occur in abundance include *Asplenium platyneuron*, *Pachysandra procumbens*, *Phlox glaberrima*, *P. maculata*, *Collinsonia canadensis*, *Mitchella repens*, and *Marshallia trinervia*. Other open habitats support a more weedy flora of many legumes and composites.

A noteworthy limestone site occurs at an elevation of 1250 to 1300 ft in a northwesterly exposure toward the mouth of Savage Gulf. Calciphiles of this site are *Agave virginica*, *Quercus muehlenbergii*, *Bumelia lycioides*, *Fraxinus quadrangulata*, *Swertia carolinensis*, and *Echinacea purpurea*.

#### RARE TENNESSEE PLANTS<sup>2</sup>

Several rare Tennessee plants, designated as such by the Committee for Tennessee Rare Plants (1978), occur in Savage Gulf. These are listed below with their degree of endangerment in Tennessee and location within the study area.

1. *Woodwardia virginica* (L.) Smith—SPECIAL CONCERN. Dense colonies in swamp on extreme western edge of south rim, 14 May 1977, *Webb & Wofford* 812; upland swamp on north rim, 15 May 1977, *Webb & Wofford* 819.

2. *Poa languida* Hitchcock—SPECIAL CONCERN. Mouth of Gulf, flood plain, 26 Apr 1977, *Phillippe & Patrick* 3769.

3. *Carex pedunculata* Muhl.—SPECIAL CONCERN. Savage Gulf below still, under hemlock, 4 May 1977, *Kral* 59910.

4. *Veratrum woodii* Robbins—ENDANGERED. Savage Gulf, nw of Sewanee, Jul 1972, M. Rhinehart s.n.; north facing slope near western end of Gulf, 23 Jul 1977, *Patrick, Phillippe, & Simmers* 289. This taxon is genuinely rare in the Southeast (Johnson, 1969) and the Savage Gulf population of about 200 individuals is the only known Tennessee locality.

5. *Zigadenus leimanthoides* Gray—THREATENED. Locally abundant in upland swamp on north rim, 22 Jun 1977, *Wofford & Webb* 77-90.

6. *Platanthera integrilabia* (Correll) Luer—ENDANGERED. Locally abundant in upland swamp on north rim, 26 Jul 1977, *Wofford & Webb* 77-219; swale along old logging road on south rim, 23 Jul 1977, *Patrick, Phillippe, Wilson, & Simmers* 300.

<sup>2</sup> *Trichomanes petersii* Gray—ENDANGERED. Dr. David K. Smith recently collected specimens of this rare fern from the Gulf. Exact data and discussion of this report will appear separately.

7. *Cimicifuga rubifolia* Kearney—THREATENED. Near base of caprock on north facing slope, 23 Jul 1977, *Patrick, Phillippe, & Simmers* 288.

8. *Hydrastis canadensis* L.—THREATENED. Deciduous woods near flood plain on south side of Savage Creek, in mouth, 14 May 1977, *Patrick & Phillippe* 83.

9. *Panax quinquefolium* L.—THREATENED. Uncommon on north facing slope, 23 Jul 1977, *Patrick, Phillippe, & Simmers* 281.

10. *Montropsis odorata* Schweinitz in Ell.—THREATENED. Well-rotted wood along trail on north rim of Savage Gulf, ca. 0.5 mi W of Meadow Creek, elev. 1820 ft, 2 Apr 1977, M. Whitten s.n.; pine woods along foot trail on north rim near edge of gorge, 26 Apr 1977, *Wofford, Webb, & Rader* 77-29.

In addition, *Carex hitchcockiana* Dewey was collected from the base of the south rim on limestone near Savage Creek, 8 Jun 1977, *Patrick, Phillippe, & Malter* 201. Although this is the first collection on record in a Tennessee herbarium, Fernald (1950) and Underwood (1962) include this taxon for Tennessee. Another noteworthy record is the first verification of *Chelone lyonii* from the Cumberland Plateau.

#### BOTANICAL-ECOLOGICAL SIGNIFICANCE

Savage Gulf is one of the more floristically diverse natural areas in Tennessee. Considering the size of the area (ca. 10 sq. mi.), it contains an extremely high number of taxa (680) with elements from the Interior Low Plateau, the Appalachian Highlands, and the southeastern Coastal Plain. Several Tennessee rare plants occur here, including the only known locality for *Veratrum woodii* in the State. Furthermore, as noted by Quarterman *et al.* (1972), the forest that occurs on much of the north facing slope is an important virgin relic of mixed mesophytic forest.

The area is presently under the management of the Tennessee Heritage Program of the Tennessee Department of Conservation, as part of the Savage Gulf Natural Area. It is our recommendation to those responsible for maintaining the antiquity and botanical uniqueness of the area that any development be limited to primitive use. All concerned citizens must shoulder the responsibility to preserve yet another small piece of our natural heritage.

#### ACKNOWLEDGEMENTS

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#### FLORISTIC SUMMARY

Collections were made throughout the study area from mid-April through

October, 1977. Voucher specimens are deposited in the University of Tennessee Herbarium, Knoxville (TENN) and duplicates will be distributed at a later date.

A total of 680 taxa from 360 genera and 111 families is represented in the flora. For the most part, nomenclature is that of Radford, Ahles, & Bell (1968). Taxa are arranged alphabetically by family, genus, and species under three major headings, as follows: PTERIDOPHYTES (ferns and fern allies), GYMNOSPERMS, and ANGIOSPERMS. Number(s) after each entry refer to the general locality or plant community from which the voucher was collected. Slight records are not included. These areas are delimited in a preceding section, as follows:

1—Upland Swamp on North Rim	4—South Facing Slope
2—North Rim Woods	5—North Facing Slope
3—South Rim Woods	6—Mouth of Gulf

#### I. PTERIDOPHYTES

##### ADIANTACEAE

- Adiantum pedatum* L.—4
- Cheilanthes lanosa* (Michx.) D.C. Eaton  
—4
- Pellaea atropurpurea* (L.) Link—6

##### ASPLENIACEAE

- Asplenium montanum* Willd.—5
- Asplenium platyneuron* (L.) Oakes—3,  
5, 6
- Asplenium rhizophyllum* L.—5
- Athyrium asplenioides* (Michx.) A. A. Eaton—1, 3
- Athyrium pycnocarpon* (Sprengel) Tidestrom—5
- Athyrium thelypteroides* (Michx.) Desvaux—5
- Cystopteris bulbifera* (L.) Bernh.—5
- Cystopteris protrusa* (Weatherby) Blas dell—4, 6
- Dryopteris goldiana* (Hooker) Gray—5
- Dryopteris intermedia* (Willd.) Gray—5
- Dryopteris marginalis* (L.) Gray—3, 4,  
5

- Polystichum acrostichoides* (Michx.) Schott—4
- Thelypteris hexagonoptera* (Michx.) Weatherby—5
- Thelypteris noveboracensis* (L.) Nieuw land—3, 5

##### BLECHNACEAE

- Woodwardia areolata* (L.) Moore—1
- Woodwardia virginica* (L.) Smith—1,  
3

##### DENNSTAEDIACEAE

- Dennstaedtia punctilobula* (Michx.) Moore—3, 5
- Pteridium aquilinum* L.—2

##### HYMENOPHYLLACEAE

- Trichomanes petersii* Gray—4

##### LYCOPDIACEAE

- Lycopodium lucidulum* Michx.—5
- Lycopodium obscurum* L.—2, 3
- Lycopodium porophilum* Lloyd & Underwood—4
- Lycopodium tristachyum* Pursh—2, 3

##### OPHIOGLOSSACEAE

- Botrychium dissectum* Sprengel—3, 5, 6
- Botrychium virginianum* (L.) Swartz—4, 5

##### OSMUNDACEAE

- Osmunda cinnamomea* L.—3
- Osmunda regalis* (Willd.) Gray—1

##### POLYPODIACEAE

- Polypodium polypodioides* (L.) Watt—5
- Polypodium virginianum* L.—5

SCHIZAEACEAE  
*Lygodium palmatum* (Bernh.) Swartz —2

SELAGINELLACEAE  
*Selaginella apoda* (L.) Spring—4

VITTARIACEAE  
*Vittaria* sp. (gametophyte)—5

II. GYMNOSPERMS  
 PINACEAE  
*Pinus echinata* Miller—3  
*Pinus taeda* L.—3  
*Pinus virginiana* Miller—2, 3, 4  
*Tsuga canadensis* (L.) Carr.—5

CUPRESSACEAE  
*Juniperus virginiana* L.—3

III. ANGIOSPERMS  
 ACANTHACEAE  
*Ruellia caroliniensis* (Walt.) Steud.—6

ACERACEAE  
*Acer negundo* L.—3  
*Acer pensylvanicum* L.—5  
*Acer rubrum* L.—3  
*Acer saccharum* Marsh.—5

ALISMATACEAE  
*Alisma subcordatum* Raf.—2  
*Sagittaria latifolia* Willd.—2, 6  
*Sagittaria engelmanniana* J. G. Smith  
ssp. *longirostra* (Micheli) Bogin—3

AMARYLLIDACEAE  
*Agave virginica* L.—6  
*Hypoxis hirsuta* (L.) Coville—3, 6

ANACARDIACEAE  
*Rhus copallina* L.—3  
*Rhus glabra* L.—6  
*Rhus radicans* L.—4

ANNONACEAE  
*Asimina triloba* (L.) Dunal—5

APIACEAE  
*Angelica venenosa* (Greenway) Fern.—3  
*Chaerophyllum tainturieri* Hooker—6  
*Cicuta maculata* L.—4

Cryptotaenia canadensis (L.) DC.—6  
*Daucus carota* L.—6  
*Eriogonum bulbosa* (Michx.) Nutt.—5  
*Eryngium yuccifolium* Michx.—3  
*Ligusticum canadense* (L.) Britt.—6  
*Osmorhiza claytonii* (Michx.) Clarke  
—5, 6  
*Oxypolis rigidior* (L.) Raf.—1, 3  
*Sanicula canadensis* L.—3, 5  
*Sanicula gregaria* Bicknell—5  
*Sanicula smallii* Bicknell—4  
*Sanicula trifoliata* Bicknell—5  
*Taenidia integerrima* (L.) Drude—6  
*Thaspium barbinode* (Michx.) Nutt.—  
4, 5  
*Zizia aptera* (Gray) Fern.—6

AQUIFOLIACEAE  
*Ilex ambigua* (Michx.) Torr. var. *mon-  
tana* (T. & G.) Ahles—2, 3, 6  
*Ilex decidua* Walt.—6  
*Ilex opaca* Ait.—3, 4

ARACEAE  
*Arisaema triphyllum* (L.) Schott—4, 5

ARALIACEAE  
*Aralia racemosa* L.—6  
*Aralia spinosa* L.—3, 6  
*Panax quinquefolium* L.—5

ARISTOLOCHIACEAE  
*Aristolochia macrophylla* Lam.—5  
*Aristolochia serpentaria* L.—5  
*Asarum canadense* L.—5  
*Hexastylis arifolia* (Michx.) Small—2,  
4

ASCLEPIADACEAE  
*Asclepias amplexicaulis* Smith—3  
*Asclepias quadrifolia* Jacq.—4, 5  
*Asclepias tuberosa* L.—3  
*Asclepias variegata* L.—3  
*Matelea carolinensis* (Jacq.) Woodson  
—6

ASTERACEAE  
*Ambrosia artemisiifolia* L.—3  
*Ambrosia trifida* L.—6  
*Antennaria plantaginifolia* (L.) Hook.  
—3  
*Antennaria solitaria* Rydb.—4  
*Aster cordifolius* L.—6  
*Aster divaricatus* L.—3, 5, 6

*Aster dumosus* L.—2  
*Aster infirmus* Michx.—3  
*Aster laevis* L.—6  
*Aster lateriflorus* (L.) Britt.—4, 6  
*Aster linariifolius* L.—3  
*Aster lowrieanus* Porter—3  
*Aster patens* Ait.—3  
*Aster paternus* Cronquist—2, 3  
*Aster shortii* Lindl.—2, 6  
*Aster simplex* Willd.—3  
*Aster solidagineus* Michx.—3  
*Aster surculosus* Michx.—2, 3  
*Aster umbellatus* Mill.—1, 6  
*Bidens bipinnata* L.—6  
*Bidens frondosa* L.—2  
*Bidens polylepis* Blake—3  
*Cacalia atriplicifolia* L.—6  
*Chrysanthemum leucanthemum* L.—3  
*Cirsium altissimum* (L.) Sprengel—2  
*Cirsium muticum* Michx.—6  
*Coreopsis auriculata* L.—6  
*Coreopsis major* Walt. var. *stellata* (Nutt.) Robinson—3  
*Echinacea purpurea* (L.) Moench—6  
*Elephantopus carolinianus* Willd.—6  
*Elephantopus tomentosus* L.—6  
*Erechtites hieracifolia* (L.) Raf.—2, 3, 6  
*Erigeron annuus* (L.) Pers.—3  
*Erigeron canadensis* L.—6  
*Erigeron pulchellus* Michx.—4  
*Erigeron strigosus* Muhl. ex Willd.—3  
*Eupatorium album* L.—3  
*Eupatorium aromaticum* L.—3  
*Eupatorium hyssopifolium* L.—3  
*Eupatorium incarnatum* Walt.—6  
*Eupatorium perfoliatum* L.—3  
*Eupatorium purpureum* L.—3, 5, 6  
*Eupatorium rotundifolium* L.—3  
*Eupatorium rugosum* Houtt.—6  
*Eupatorium serotinum* Michx.—3  
*Gnaphalium helleri* Britt.—3  
*Gnaphalium obusifolium* L.—3  
*Gnaphalium purpureum* L.—4  
*Helenium autumnale* L.—3  
*Helianthus atrorubens* L.—3  
*Helianthus decapetalus* L.—6  
*Helianthus hirsutus* Raf.—6  
*Helianthus microcephalus* T. & G.—6  
*Heliopsis helianthoides* (L.) BSP—4, 6  
*Heterotheca graminifolia* (Michx.) Shinners—3  
*Heterotheca mariana* (L.) Shinners—2, 3  
*Hieracium gronovii* L.—2, 3  
*Hieracium paniculatum* L.—3  
*Hieracium venosum* L.—3, 4  
*Krigia biflora* (Walt.) Blake—3, 6  
*Lactuca canadensis* L.—6  
*Lactuca floridana* (L.) Gaertn.—6  
*Liatis aspera* Michx.—3  
*Liatis microcephala* (Small) K. Schumann—2  
*Liatis spicata* (L.) Willd.—3  
*Marshallia trinervia* (Walt.) Trelease ex Branner & Coville—6  
*Parthenium integrifolium* L.—3  
*Polymnia canadensis* L.—4, 5  
*Polymnia uvedalia* L.—6  
*Prenanthes altissima* L.—3, 6  
*Prenanthes serpentaria* Pursh—3  
*Pyrrhopappus carolinianus* (Walt.) DC.—6  
*Rudbeckia fulgida* Ait. var. *umbrosa* (Boynton & Beadle) Cronquist—6  
*Rudbeckia hirta* L.—3, 6  
*Rudbeckia laciniata* L.—3, 6  
*Senecio aureus* L.—6  
*Senecio obovatus* Muhl. ex Willd.—4  
*Senecio smallii* Britt.—3  
*Silphium trifoliatum* L.—6  
*Solidago arguta* Ait.—3  
*Solidago boottii* Hook. var. *boottii*—6  
*Solidago boottii* Hook. var. *caroliniana* (Gray) Cronquist—3  
*Solidago caesia* L.—6  
*Solidago canadensis* L. var. *scabra* (Muhl.) T. & G.—3, 6  
*Solidago curtisii* T. & G.—3  
*Solidago erecta* Pursh—2, 3, 6  
*Solidago flexicaulis* L.—6  
*Solidago gigantea* Ait.—2, 6  
*Solidago graminifolia* (L.) Salisb. var. *nuttallii* (Greene) Fern.—2  
*Solidago hispida* Muhl.—3  
*Solidago nemoralis* Ait.—3  
*Solidago odora* Ait.—2, 3, 6  
*Solidago roanensis* Porter—6  
*Solidago rugosa* Mill. ssp. *aspera* (Ait.) Cronquist—2, 6  
*Solidago ulmifolia* Muhl.—3, 6  
*Taraxacum officinale* Wiggers—6  
*Verbesina alternifolia* (L.) Britt.—6  
*Vernonia altissima* Nutt.—6

#### BALSAMINACEAE

*Impatiens capensis* Meerb.—6  
*Impatiens pallida* Nutt.—5

BERBERIDACEAE

*Caulophyllum thalictroides* (L.) Michx.  
—5

*Podophyllum peltatum* L.—5

BETULACEAE

*Alnus serrulata* (Ait.) Willd.—2

*Betula lutea* Michx. f.—4, 5

*Betula nigra* L.—2

*Carpinus caroliniana* Walt.—6

*Corylus americana* Walt.—6

*Ostrya virginiana* (Mill.) K. Koch—5

BIGNONIACEAE

*Anisostichus capreolata* (L.) Bureau—  
4, 6

*Campsis radicans* (L.) Seemann—6

*Paulownia tomentosa* (Thunb.) Steud.  
—6

BORAGINACEAE

*Cynoglossum virginianum* L.—4

*Lithospermum tuberosum* Rugel ex DC.  
—4

BRASSICACEAE

*Arabis canadensis* L.—6

*Arabis leavigata* (Muhl. ex Willd.)  
Poir.—4, 6

*Cardamine hirsuta* L.—6

*Dentaria laciniata* Muhl.—5

BUXACEAE

*Pachysandra procumbens* Michx.—6

CALYCANTHACEAE

*Calycanthus floridus* L.—4

CAMPANULACEAE

*Campanula americana* L.—6

*Lobelia cardinalis* L.—6

*Lobelia inflata* L.—2, 3

*Lobelia puberula* Michx.—6

*Specularia perfoliata* (L.) DC.—3, 6

CAPRIFOLIACEAE

*Lonicera japonica* Thunb.—6

*Lonicera sempervirens* L.—3

*Sambucus canadensis* L.—6

*Sambucus pubens* Michx.—5

*Triosteum perfoliatum* L.—3

*Viburnum acerifolium* L.—2

*Viburnum cassinoides* L.—2

*Viburnum dentatum* L.—3

Vaccinaceae

*Vaccinium pensylvanicum* L.—3

VIBURNUM

*Viburnum nudum* L.—2, 3

*Viburnum rufidulum* Raf.—2, 6

CARYOPHYLLACEAE

*Cerastium holostcoides* Fries var. *vulgare*  
(Hartman) Hylander—6

*Silene rotundifolia* Nutt.—4, 5

*Silene stellata* (L.) Ait. f.—3

*Silene virginica* L.—4

*Stellaria pubera* Michx.—5

CELASTRACEAE

*Euonymus americanus* L.—5, 6

*Euonymus atropurpureus* Jacq.—6

CISTACEAE

*Leccha racemulosa* Michx.—3, 6

COMMELINACEAE

*Tradescantia subaspera* Ker—6

CONVOLVULACEAE

*Calystegia spithamea* (L.) R. Brown—  
6

*Cuscuta campestris* Yuncker—6

*Cuscuta compacta* Juss.—3

*Ipomoea purpurea* (L.) Roth—6

CORNACEAE

*Cornus alternifolia* L. f.—5

*Cornus amomum* Mill.—6

*Cornus florida* L.—5

CRASSULACEAE

*Sedum ternatum* Michx.—4

CYPERACEAE

*Carex aestivalis* M. A. Curtis—3, 6

*Carex alboluteascens* Schwein.—3

*Carex albursina* Sheldon—3

*Carex amphibola* Steud.—2

*Carex austro-caroliniana* Bailey—4

*Carex baileyi* Britt.—3

*Carex cephalophora* Muhl. ex Schkuhr  
—3

*Carex communis* Bailey—2, 4

*Carex complanata* Torr. & Hook.—3

*Carex crinita* Lam.—3

*Carex debilis* Michx. var. *rudgei* Bailey  
—1, 2, 3

*Carex emmonsii* Dewey—5

*Carex flaccosperma* Dewey—1

*Carex gigantea* Rudge—1

*Carex hitchcockiana* Dewey—6

*Carex incompta* Bicknell—3  
*Carex intumescens* Rudge—1, 2, 3  
*Carex jamesii* Schwein.—6  
*Carex joorii* Bailey—1  
*Carex laxiflora* Lam.—3, 5  
*Carex lurida* Wahl.—3  
*Carex pedunculata* Muhl.—5  
*Carex pensylvanica* Lam. var. *distans* Peck—4  
*Carex plantaginea* Lam.—5  
*Carex purpurifera* Mackenzie—2, 4, 5  
*Carex retroflexa* Muhl. ex Schkuhr—6  
*Carex rosa* Schkuhr—2  
*Carex swanii* (Fern.) Mackenzie—2, 3, 6  
*Carex virescens* Muhl. ex Schkuhr—2, 3, 6  
*Cyperus praelongatus* Steud.—6  
*Cyperus retrofractus* (L.) Torr.—3  
*Cyperus strigosus* L.—6  
*Eleocharis obtusa* (Willd.) Schultes—3  
*Rhynchospora capitellata* (Michx.) Vahl—3, 5  
*Rhynchospora corniculata* (Lam.) Gray—1  
*Scirpus atrovirens* Willd. var. *georgianus* (Harper) Fern.—3, 6  
*Scirpus cyperinus* (L.) Kunth—1  
*Scleria oligantha* Michx.—6  
*Scleria trigloidea* Michx.—3

DIOSCOREACEAE

*Dioscorea batatas* Dcne.—6  
*Dioscorea villosa* L.—4, 6

EBENACEAE

*Diospyros virginiana* L.—3

ERICACEAE

*Chimaphila maculata* (L.) Pursh—6  
*Epigaea repens* L.—3, 4, 6  
*Kalmia latifolia* L.—2, 3, 4  
*Lyonia ligustrina* (L.) DC.—3  
*Monotropa hypopithys* L.—3  
*Monotropa uniflora* L.—6  
*Monotropis odorata* Schwein. in Ell.—2  
*Oxydendrum arboreum* (L.) DC.—3  
*Rhododendron alabamense* Rehder—1, 3  
*Rhododendron arborescens* (Pursh) Torr.—6  
*Rhododendron calendulaceum* (Michx.) Torr.—3

*Rhododendron cumberlandense* Braun—3  
*Rhododendron maximum* L.—5  
*Rhododendron nudiflorum* (L.) Torr.—3, 4  
*Vaccinium arboreum* Marsh.—2  
*Vaccinium constabaei* Gray—2, 4  
*Vaccinium corymbosum* L.—3  
*Vaccinium stamineum* L.—3  
*Vaccinium vacillans* Torr.—3, 4

EUPHORBIACEAE

*Acalypha gracilens* Gray—3  
*Acalypha rhomboidea* Raf.—6  
*Croton monanthogynus* Michx.—3  
*Euphorbia corollata* L. var. *zinniiflora* (Small) Ahles—3  
*Euphorbia mercurialina* Michx.—4

FABACEAE

*Albizia julibrissin* Durazzini—3  
*Amphicarpa bracteata* (L.) Fern.—6  
*Apis americana* Medicus—3  
*Baptisia tinctoria* (L.) R. Brown—2, 3  
*Cassia marilandica* L.—6  
*Cassia nictitans* L.—6  
*Cercis canadensis* L.—6  
*Cladrastis lutea* (Michx. f.) K. Koch—5  
*Clitoria mariana* L.—3  
*Desmodium cuspidatum* (Muhl. ex Willd.) Loudon—6  
*Desmodium glutinosum* (Muhl. ex Willd.) Wood—6  
*Desmodium marilandicum* (L.) DC.—3  
*Desmodium nudiflorum* (L.) DC.—2, 6  
*Desmodium paniculatum* (L.) DC. var. *paniculatum*—2, 6  
*Desmodium paniculatum* (L.) DC. var. *dillenii* (Darl.) Isely—3, 6  
*Desmodium obtusum* (Muhl. ex Willd.) DC.—6  
*Desmodium pauciflorum* (Nutt.) DC.—6  
*Desmodium rotundifolium* DC.—6  
*Galactia volubilis* (L.) Britt.—6  
*Lespedeza bicolor* Turcz.—3  
*Lespedeza cuneata* (Dumont) G. Don—3  
*Lespedeza hirta* (L.) Hornemann—2, 3  
*Lespedeza hirta* X *intermedia*—2, 3  
*Lespedeza intermedia* (S. Wats.) Britt.—3, 6

*Lespedeza repens* (L.) Bart.—3  
*Lespedeza steuwei* Nutt.—3  
*Melilotus alba* Desr.—3  
*Psoralea psoraloides* (Walt.) Cory—4  
*Robinia* (hybrid)—2  
*Robinia pseudo-acacia* L.—4  
*Schrankia microphylla* (Soland. ex Sm.) McBride—3  
*Stylosanthes biflora* (L.) BSP.—3  
*Tephrosia virginiana* (L.) Pers.—2, 3  
*Trifolium campestre* Schreb.—6  
*Trifolium pratense* L.—6  
*Vicia caroliniana* Walt.—6

FAGACEAE

*Castanea dentata* (Marsh.) Borkh.—3, 4  
*Fagus grandifolia* Ehrhart—2  
*Quercus alba* L.—3  
*Quercus coccinea* Meunchh.—3  
*Quercus falcata* Michx.—3  
*Quercus marilandica* Muenchh.—3  
*Quercus muchlenbergii* Engelm.—6  
*Quercus prinus* L.—3  
*Quercus rubra* L.—3  
*Quercus stellata* Wang.—3  
*Quercus velutina* Lam.—3

FUMARIACEAE

*Dicentra cucullaria* (L.) Bernh.—5

GENTIANACEAE

*Bartsia virginica* (L.) BSP.—1, 3  
*Gentiana quinquefolia* L.—4, 6  
*Gentiana saponaria* L.—1, 3  
*Gentiana villosa* L.—2, 3  
*Sabatia brachiata* Ell.—3  
*Swertia caroliniensis* (Walt.) Kuntze—6

GERANIACEAE

*Geranium carolinianum* L.—6  
*Geranium maculatum* L.—4

HALORATACEAE

*Proserpinaca pectinata* Lam.—1

HAMAMELIDACEAE

*Hamamelis virginiana* L.—2, 5  
*Liquidambar styraciflua* L.—4, 6

HIPPOCASTANACEAE

*Aesculus octandra* Marsh.—5, 6

HYDROPHYLLOIDAE

*Hydrophyllum canadense* L.—5

Phacelia bipinnatifida Michx.—5

HYPERICACEAE

*Hypericum denticulatum* Walt. var. *recognitum* Fern. & Schub.—3  
*Hypericum gentianoides* (L.) BSP.—2, 3  
*Hypericum mutilum* L.—3  
*Hypericum nudiflorum* Michx. ex Willd.—6  
*Hypericum prolificum* L.—6  
*Hypericum punctatum* Lam.—2, 6  
*Hypericum stans* (Michx.) P. Adams & Robson—3  
*Hypericum stragulum* P. Adams & Robson—3, 6

IRIDACEAE

*Iris cristata* Ait.—4, 5  
*Sisyrinchium albidum* Raf.—6  
*Sisyrinchium angustifolium* Mill.—6

JUGLANDACEAE

*Carya cordiformis* (Wang.) K. Koch—5  
*Carya glabra* (Mill.) Sweet—6  
*Carya ovalis* (Wang.) Sarg.—6  
*Carya ovata* (Mill.) K. Koch—5  
*Carya pallida* (Ashe) Engler & Graebn.—3  
*Carya tomentosa* (Poir.) Nutt.—6  
*Juglans cinerea* L.—6  
*Juglans nigra* L.—6

JUNCACEAE

*Juncus canadensis* J. Gay ex La Harpe—3  
*Juncus coriaceus* Mackenzie—3  
*Juncus debilis* Gray—1, 3  
*Juncus effusus* L.—1, 3  
*Juncus marginatus* Rostk.—3  
*Juncus repens* Michx.—1  
*Juncus tenuis* Willd.—2, 3  
*Luzula acuminata* L.—6  
*Luzula bulbosa* (Wood) Rydb.—3

LAMIACEAE

*Collinsonia canadensis* L.—6  
*Dracocephalum virginianum* L.—6  
*Lycopus virginicus* L.—2, 3, 6  
*Monarda clinopodia* L.—4, 6  
*Mosla dianthera* (Hamilton) Michx.—6  
*Perilla frutescens* (L.) Britt.—6  
*Prunella vulgaris* L.—3

*Pycnanthemum incanum* (L.) Michx.—  
6  
*Pycnanthemum muticum* (Michx.) Pers.  
—3  
*Salvia lyrata* L.—6  
*Salvia urticifolia* L.—6  
*Scutellaria elliptica* Muhl.—3, 6  
*Scutellaria pseudoserrata* Epling—6  
*Trichostema dichotomum* L.—6

LAURACEAE

*Lindera benzoin* (L.) Blume—2, 5  
*Sassafras albidum* (Nutt.) Nees—4

LILIACEAE

*Aletris farinosa* L.—3  
*Allium canadense* L.—6  
*Chamaelirium luteum* (L.) Gray—3  
*Disporum lanuginosum* (Michx.) Nicolson—5  
*Disporum maculatum* (Buckl.) Britt.—5  
*Erythronium americanum* Ker—6  
*Lilium michiganense* Farw.—1  
*Medeola virginiana* L.—2  
*Polygonatum biflorum* (Walt.) Ell.—3  
*Polygonatum pubescens* (Willd.) Pursh —5  
*Smilacina racemosa* (L.) Desf.—4  
*Smilax bona-nox* L.—6  
*Smilax cecropia* (Engelm.) Watson var.  
huberi (Small) Ahles—4, 5, 6  
*Smilax glauca* Walt.—3, 4  
*Smilax hispida* Muhl.—6  
*Smilax rotundifolia* L.—3, 4, 6  
*Trillium cuneatum* Raf.—5, 6  
*Trillium erectum* L.—5  
*Trillium grandiflorum* (Michx.) Salisb.  
—5  
*Trillium recurvatum* Beck—5  
*Uvularia grandiflora* Smith—5, 6  
*Uvularia perfoliata* L.—6  
*Uvularia sessilifolia* L.—2, 3  
*Veratrum woodii* Robbins—5  
*Zigadenus leimanthoides* Gray—1

LINACEAE

*Linum striatum* Walt.—2, 3  
*Linum virginianum* L. var. *floridanum*  
Planchon—3

LOGANIACEAE

*Spigelia marilandica* L.—6

LORANTHACEAE

*Phoradendron serotinum* (Raf.) M. C.  
Johnston—5

MAGNOLIACEAE

*Lirodendron tulipifera* L.—4  
*Magnolia acuminata* L.—4  
*Magnolia tripetala* L.—6

MALVACAE

*Hibiscus syriacus* L.—6

MELASTOMATACEAE

*Rhexia mariana* L.—3  
*Rhexia virginica* L.—3

MORACEAE

*Morus rubra* L.—6

NYSSACEAE

*Nyssa sylvatica* Marsh.—4, 5

OLEACEAE

*Chionanthus virginicus* L.—3  
*Ligustrum vulgare* L.—5  
*Fraxinus americana* L. var. *biltmoreana*  
(Beadle) J. Wright ex Fern.—6  
*Fraxinus quadrangulata* Michx.—6

ONAGRACEAE

*Circaea lutetiana* L. ssp. *canadensis* (L.)  
Aschers. & Magnus—6  
*Ludwigia alternifolia* L.—2, 3  
*Oenothera biennis* L.—6  
*Oenothera tetragona* Roth—3

ORCHIDACEAE

*Aplectrum hyemale* (Muhl. ex Willd.)  
Tort.—5  
*Corallorrhiza odontorhiza* (Willd.) Nutt.  
—3, 6  
*Cypripedium acaule* Ait.—2  
*Cypripedium calceolus* L. var. *pubescens*  
(Willd.) Correll—4  
*Goodyera pubescens* (Willd.) R. Brown  
—3  
*Hexalectris spicata* (Walt.) Barnhart—  
6  
*Isotria verticillata* (Muhl. ex Willd.)  
Raf.—1  
*Malaxis unifolia* Michx.—2, 3  
*Orchis spectabilis* L.—4  
*Platanthera ciliaris* (L.) Lindley—1, 3

*Platanthera clavellata* (Michx.) Luer—  
1, 3  
*Platanthera cristata* (Michx.) Lindley—  
1  
*Platanthera integrilabia* (Correll) Luer—  
—1, 3  
*Tipularia discolor* (Pursh) Nutt.—6  
*Triphora trianthophora* (Swartz) Rydb.—  
5

OROBANCHACEAE

*Conopholis americana* (L.) Wallroth—  
4  
*Epifagus virginiana* (L.) Barton—5, 6

OXALIDACEAE

*Oxalis dilrenii* Jacq.—6  
*Oxalis stricta* L.—6  
*Oxalis violacea* L.—6

PAPAVERACEAE

*Sanguinaria canadensis* L.—5  
*Stylophorum diphyllum* (Michx.) Nutt.—  
5

PASSIFLORACEAE

*Passiflora lutea* L.—6

PHRYMACEAE

*Phryma leptostachya* L.—4

PHYTOLACCACEAE

*Phytolacca americana* L.—6

PLANTAGINACEAE

*Plantago aristata* Michx.—3  
*Plantago lanceolata* L.—3  
*Plantago rugelii* DCne.—6  
*Plantago virginica* L.—6

PLATANACEAE

*Platanus occidentalis* L.—4, 6

POACEAE

*Agrostis perennans* (Walt.) Tuckerman—  
2, 3, 6  
*Andropogon gerardii* Vitman—3  
*Andropogon scoparius* Michx.—2, 3  
*Andropogon virginicus* L.—6  
*Aristida dichotoma* Michx.—3  
*Arundinaria gigantea* (Walt.) Muhl.—  
6  
*Brachelytrum erectum* (Schreb.) Beauv.—  
6  
*Bromus purgans* L.—6

*Bromus secalinus* L.—2  
*Calamagrostis cinnoides* (Muhl.) Bart.—  
1, 3  
*Chasmanthium latifolium* (Michx.)  
Yates—6  
*Chasmanthium laxum* (L.) Yates—3  
*Cinna arundinacea* L.—6  
*Dactylis glomerata* L.—3  
*Danthonia compressa* Austin—3  
*Danthonia sericea* Nutt.—2  
*Danthonia spicata* (L.) Beauv. ex R. &  
S.—6  
*Deschampsia flexuosa* (L.) Trin.—2, 3  
*Diarrhena americana* Beauv.—6  
*Digitaria ischaemum* (Schreb.) Schreb.  
ex Muhl. var. ischaemum—3  
*Digitaria ischaemum* (Schreb.) Schreb.  
ex Muhl. var. violascens (Link) Rad-  
ford—3  
*Echinochloa muricata* (Beauv.) Fern.—  
3  
*Elcusine indica* (L.) Gaertner—3  
*Elymus virginicus* L.—3  
*Eragrostis spectabilis* (Pursh) Steudel—  
3  
*Erianthus alopecuroides* (L.) Ell.—6  
*Festuca elatior* L.—3  
*Festuca obtusa* Biehler—6  
*Holcus lanatus* L.—3  
*Hystrix patula* Moench—6  
*Leersia virginica* Willd.—3, 6  
*Lolium multiflorum* Lam.—3  
*Melica mutica* Walt.—2, 4  
*Microstegium viminum* (Trin.) A.  
Camus—3  
*Muhlenbergia schreberi* J. F. Gmelin—  
3  
*Muhlenbergia sylvatica* (Torr.) Torr. ex  
Gray—6  
*Panicum anceps* Michx.—3  
*Panicum boscii* Poir.—2, 6  
*Panicum clandestinum* L.—3  
*Panicum dichotomum* L.—1, 3  
*Panicum laxiflorum* Lam.—3, 6  
*Panicum longifolium* Torr.—1  
*Panicum longiligulatum* Nash—1  
*Panicum philadelphicum* Bernh.—3  
*Panicum polyanthes* Schult.—2  
*Panicum sphaerocarpon* Ell.—3  
*Paspalum laeve* Michx.—3  
*Poa compressa* L.—3  
*Poa languida* Hitchc.—6  
*Poa pratensis* L.—6

*Setaria faberii* W. Herrmann—3  
*Setaria geniculata* (Lam.) Beauv.—3  
*Sorghastrum nutans* (L.) Nash—3  
*Sphenopholis nitida* (Biehler) Scribnér—4  
*Sporobolus vaginiflorus* (Torr.) Wood—3  
*Stipa avenacea* L.—2, 6  
*Tridens flavus* (L.) Hitchc.—6

POLEMONIACEAE

*Phlox amoena* Sims—2  
*Phlox carolina* L.—6  
*Phlox divaricata* L.—4, 5, 6  
*Phlox glaberrima* L.—6  
*Phlox maculata* L. ssp. *pyramidalis* (Smith) Wherry—2, 6  
*Phlox pilosa* L.—6

POLYGALACEAE

*Polygala curtissii* Gray—3  
*Polygala incarnata* L.—3  
*Polygala senega* L.—4  
*Polygala verticillata* L.—2, 3

POLYGONACEAE

*Polygonum cespitosum* Blume var. *longisetum* (DeBruyn) Stewart—6  
*Polygonum persicaria* L.—6  
*Polygonum punctatum* Ell.—6  
*Polygonum scandens* L.—6  
*Rumex acetosella* L.—6  
*Rumex crispus* L.—6  
*Tovara virginiana* (L.) Raf.—6

PORTULACACEAE

*Claytonia caroliniana* Michx.—5

PRIMULACEAE

*Lysimachia lanceolata* Walt.—6  
*Lysimachia quadrifolia* L.—3, 6  
*Lysimachia tonsa* (Wood) Kunth—6

RANUNCULACEAE

*Actaea pachypoda* Ell.—5  
*Anemone quinquefolia* L.—6  
*Anemone virginiana* L.—6  
*Aquilegia canadensis* L.—4  
*Cimicifuga rubifolia* Kearney—5  
*Clematis virginiana* L.—6  
*Delphinium tricorne* Michx.—5  
*Hepatica acutiloba* DC.—5  
*Hydrastis canadensis* L.—6  
*Ranunculus abortivus* L.—6

*Ranunculus recurvatus* Poir.—5  
*Thalictrum clavatum* DC.—4, 5  
*Thalictrum pubescens* Pursh—6  
*Thalictrum thalictroides* (L.) Boivin—5, 6  
*Xanthorhiza simplicissima* Marsh.—2, 6

RHAMNACEAE

*Ceanothus americanus* L.—6  
*Rhamnus caroliniana* Walt.—6

ROSACEAE

*Agrimonia parviflora* Ait.—6  
*Agrimonia pubescens* Wallroth—6  
*Agrimonia rostellata* Wallroth—6  
*Amelanchier canadensis* (L.) Medicus—3, 6  
*Aruncus dioica* (Walt.) Fern.—6  
*Crataegus crus-galli* L.—6  
*Crataegus flabellata* (Bosc) K. Koch—3  
*Crataegus flava* Ait.—4  
*Crataegus viridis* L.—6  
*Gcum canadense* Jacq.—6  
*Gillenia stipulata* (Muhl.) Baillon—6  
*Gillenia trifoliata* (L.) Moench—3  
*Physocarpus opulifolius* (L.) Maxim.—6  
*Potentilla canadensis* L.—2  
*Potentilla norvegica* L.—6  
*Potentilla simplex* Michx.—3, 4  
*Prunus americana* Marsh.—3, 4, 6  
*Prunus serotina* Ehrh.—2, 6  
*Pyrus angustifolia* Ait.—2, 3, 6  
*Pyrus arbutifolia* (L.) L. f.—3  
*Pyrus melanocarpa* (Michx.) Schneid.—6  
*Rosa carolina* L.—5, 6  
*Rosa multiflora* Thunb.—6  
*Rubus argutus* Link—3, 6  
*Rubus betulifolius* Small—3  
*Rubus hispida* L.—2, 3  
*Rubus occidentalis* L.—4  
*Rubus phoenicolasius* Maxim.—6  
*Spiraea japonica* L.—6

RUBIACEAE

*Cephaelanthus occidentalis* L.—3  
*Diodia teres* Walt.—3  
*Diodia virginiana* L.—6  
*Galium aparine* L.—6  
*Galium circaeans* Michx.—3, 6  
*Galium latifolium* Michx.—5  
*Galium pilosum* Ait.—3, 6

Galium triflorum Michx.—3, 6

Houstonia caerulea L.—2, 3

Houstonia purpurea L.—6

Mitchella repens L.—5, 6

SALICACEAE

Salix humilis Marsh.—3

Salix nigra Marsh.—3, 6

SANTALACEAE

Pyrularia pubera Michx.—6

SAPOTACEAE

Bumelia lycioides (L.) Pers.—6

SAXIFRAGACRAE

Astilbe biternata (Vent.) Britt.—5

Heuchera americana L.—5, 6

Heuchera praviflora Barding—5

Heuchera villosa Michx.—5

Hydrangea arborescens L. ssp. discolor (Seringe) McClintock—5

Itea virginica L.—1, 2

Mitella diphylla L.—5

Parnassia asarifolia Vent.—1, 3

Penthorum sedoides L.—6

Tiarella cordifolia L.—5

SCROPHULARIACEAE

Agalinis tenuifolia (Vahl) Raf.—2, 3

Aureolaria laevigata (Raf.) Raf.—6

Aureolaria virginica (L.) Pennell—3

Chelone glabra L.—3

Chelone lyonii Pursh—6

Gratiola virginiana L.—3

Lindernia dubia (L.) Pennell—6

Mimulus alatus Ait.—6

Pedicularis canadensis L.—4

Penstemon canescens (Britt.) Britt. ssp. brevispalus (Pennell) Crosswhite—6

Verbascum blattaria L.—6

Verbascum thapsus L.—3

SIMAROUBACEAE

Ailanthus altissima (Mill.) Swingle—5

SOLANACEAE

Physalis heterophylla Nees—6

Solanum carolinense L.—3, 6

THEACEAE

Stewartia ovata (Cav.) Weatherby—4, 6

THYMELAEACEAE

Dirca palustris L.—6

TILIACEAE

Tilia heterophylla Vent.—5

TYPHACEAE

Typha latifolia L.—3

ULMACEAE

Celtis occidentalis L.—6

Ulmus alata Michx.—6

Ulmus americana L.—5

Ulmus rubra Muhl.—4

URTICACEAE

Boehmeria cylindrica (L.) Swartz—2, 6

Laportea canadensis (L.) Weddell—5, 6

Pilea pumila (L.) Gray—6

VERBENACEAE

Verbena simplex Lehmann—3

Verbena urticifolia L.—6

VIOLACEAE

Hybanthus concolor (Forster) Sprengel —5

Viola affinis LeConte—4, 5, 6

Viola blanda Willd.—5

Viola canadensis L.—5

Viola conspersa Reichenb.—4, 5, 6

Viola hastata Michx.—5

Viola hirsutula Brainerd—2

Viola pedata L.—2, 3

Viola pensylvanica Michx.—5

Viola primulifolia L.—2, 3

Viola rostrata Pursh.—5

Viola triloba Schwein.—5

VITACEAE

Parthenocissus quinquefolia (L.) Planch. —4, 5

Vitis acerifolia Michx.—3, 4, 6

Vitis cinerea Engelm. ex Millardet—4

Vitis rotundifolia Michx.—4

XYRIDACEAE

Xyris torta Smith—1

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